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FEDERAL COMMUNICATIONS COMMISSION
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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
Federal-State Joint Board on Universal Service	)	CC Docket No. 96-45
Forward-Looking Mechanism for High Cost Support for Non-Rural LECs	)	CC Docket No. 97-160

COMMENTS OF AT&T CORP. AND MCI TELECOMMUNICATIONS CORPORATION

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August 8, 1997

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SUMMARY

The Hatfield Model best addresses the switch cost modeling issues raised in the FNPRM. As shown in Section I, the Commission has correctly concluded that an appropriate cost mechanism will account for cost differences among stand-alone, host and remote switches. The Hatfield Model appropriately captures these differences by basing its switching costs on actual ILEC purchasing practices, and hence the "market" view of the appropriate forward-looking switching mix. The Commission's alternate proposal of requiring cost models dynamically to optimize switch types at each wire center is unworkable and unlikely to produce measurable benefits.

Section II addresses switch capacity constraints. AT&T and MCI agree that an appropriately designed cost model will place multiple switches in a single wire center when one or more of a switch's capacity constraints are exceeded. The Hatfield Model adheres to this allocation rule and includes conservative capacity constraints.

In Section III, AT&T and MCI explain why it would be inappropriate to require cost models to reflect in nominal dollar terms the allegedly higher per line expenses associated with adding capacity to existing switches. ILECs have failed to provide verifiable data that such differences exist even in nominal terms, much less that there are significant differences in real dollar terms after accounting for the time value of money and the trend of declines in real prices for switching components. In any event, it would be improper to focus on the impact growth has on the cost of a single input or element, because for many other elements "growth" costs will be lower on a unit basis than "new" costs.

AT&T and MCI agree with the Commission that switching costs should be divided between port and non-port costs. As discussed in Section IV, that feature is already incorporated into the Hatfield Model, and evidence from existing cost studies confirms the reasonableness of the Hatfield Model's allocation factor.

Finally, in Section V, AT&T and MCI agree that it is critically important that a cost model produce forward-looking cost estimates for network elements necessary to provide interoffice trunking, signaling, and local tandem services, because the costs of those elements vary significantly between densely and sparsely populated areas. Only the Hatfield Model generates element prices at this requisite level of disaggregation.

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Forward-Looking Mechanism for High Cost Support for Non-Rural LECs	CC Docket No. 97-160

COMMENTS OF AT&T CORP. AND
MCI TELECOMMUNICATIONS CORPORATION

Pursuant to the Commission's Further Notice of Proposed Rulemaking,[1] AT&T Corp. ("AT&T") and MCI Telecommunications Corporation ("MCI") hereby submit their joint comments with respect to the designated issues concerning the selection of a forward-looking cost mechanism for use in determining the level of federal support for universal service in high cost areas. These comments specifically address issues related to switching costs and interoffice trunking, signaling, and local tandem investment as requested by the Commission in sections III.C.3 and III.C.4 of its FNPRM.[2]

[1] Federal-State Joint Board on Universal Service, Forward-Looking Mechanism for High Cost Support for Non-Rural LECs, CC Docket Nos. 96-45, 97-160, Further Notice of Proposed Rulemaking (released July 18, 1997) ("FNPRM").

[2] AT&T and MCI will in accordance with the Notice address specific switching inputs in its separate cost model input comments and reply comments.

INTRODUCTORY STATEMENT

AT&T and MCI welcome the further opportunity to comment on the specific features, assumptions and computation processes that should characterize an appropriately designed forward-looking cost model for use in determining the level of federal universal service support in high cost areas. In this proceeding, AT&T and MCI will attempt to provide the Commission with as much detail as possible on the specific inputs and logic of the competing modeling approaches and proposals. It is important, however, that in this entirely proper focus on detail the parties not lose sight of the more general governing principles that distinguish an appropriate modeling approach from an inappropriate one.

In that regard, both the Commission and its staff and the Federal-State Joint Board on Universal Service have, over the course of the past year, enumerated a number of general principles that provide useful guides in evaluating specific modeling proposals and ultimately in selecting the best cost model. First and foremost, the model must estimate forward-looking economic cost.[3] As the Commission has repeatedly recognized, only that approach can simultaneously ensure full cost recovery and efficient investment, innovation, and entry, and thus the Commission should continue to reject attempts to "include sunk or historically incurred

[3] See, e.g., FNPRM ¶ 1(federal universal service support will be 25% of "the difference between the forward-looking economic cost and the benchmark"); Staff Cost Model Analysis ¶ 9; Public Notice, Criteria for State-Conducted Economic Cost Studies, CC Docket 96-45 (released July 29, 1997) ("State Cost Study Criteria") ("Only long-run forward-looking economic cost may be included" in state universal service cost studies); Report and Order, Federal-State Joint Board on Universal Service, CC Docket No. 96-45 ¶ 224 (released May 8, 1997) ("USF Report and Order"); Recommended Decision, Federal-State Joint Board on Universal Service, CC Docket No. 96-45 ¶ 275 (released Nov. 8, 1996) ("Recommended USF Decision").

costs." The Use of Computer Models for Estimating Forward-Looking Economic Costs: A Staff Analysis, 1997 WL 10020 ¶ 9 (January 9, 1997) ("Staff Cost Model Analysis").

Second, the model must be open and verifiable and rely, where possible, on publicly available data.[4] Users should have the ability to examine not only the model's algorithms, but also detailed documentation on its operation. Third, the model must be both user adjustable and flexible enough to serve all local network modeling needs.[5] In this regard, the cost model must produce prices for all network elements necessary to provide traditional narrowband services and current quality levels.[6] Failure to provide prices at this disaggregate level "creates a 'bottleneck' that could prevent competitors from entering the market." Staff Cost Model Analysis ¶ 10. Further, without a wide range of adjustable inputs, a model cannot reliably identify high cost areas. And the model must be one of general applicability, not one, for example, that is dependent on the characteristics of manufacturer specific equipment. Although this list is by no means exhaustive, these fundamental principles should guide the Commission in its consideration of the much narrower issues that have been raised in this FNPRM.

Models are, of course, tools of estimation, and no model -- either a cost model or ILEC study -- can be expected to achieve absolute precision on all (or, indeed, any) fronts. AT&T and MCI are confident, however, that the Hatfield Model best achieves both the Commission's

[4] See, e.g., Staff Cost Model Analysis ¶ 15; State Cost Study Criteria ("The cost study or model and all underlying data, formulae, computations, and software associated with the model must be available to all interested parties for review and comment"); USF Report and Order ¶ 242 (criticizing BCPM for lack of support and openness).

[5] See, e.g., Staff Cost Model Analysis ¶ 16.

[6] See, e.g., State Cost Study Criteria; Staff Cost Model Analysis ¶ 10.

general cost model criteria and the more specific issues raised in the FNPRM. The Hatfield Model comes closest to the forward-looking, least cost engineering ideal by building a narrowband network from the bottom-up assuming the best available technology and current wire center locations. The Hatfield Model relies on available public information. In terms of narrowband network elements, the Hatfield Model prices the largest number of elements, and it is the only model that calculates cost estimates for the individual interoffice elements necessary to provide interoffice trunking, signaling, and local tandem services. And the Hatfield Model permits the user to adjust literally many hundreds of input values including the inputs that have been subjects of contention in this proceeding and in state arbitration proceedings.

The Hatfield Model also best comports with the Commission's tentative conclusions in the FNPRM. In particular, AT&T and MCI agree with the Commission that the selected model should capture the forward-looking costs of host, stand-alone, and remote switches -- as the Hatfield Model does. The Hatfield Model satisfies the constraint that a cost model locate multiple switches at a wire center whenever one or more capacity constraints are exceeded. The Hatfield Model's switch cost values are more than adequate to properly account for "growth" lines even assuming reliable evidence existed that such additions are significantly more expensive in real dollar terms (and it does not) and that including "costs" that should never be incurred by an efficient provider was consistent with the Commission's TELRIC approach (and it is not).

AT&T and MCI also support the Commission's tentative decision to allocate switching costs between port and non-port investment. Current data and ILEC cost studies indicate that the Hatfield Model allocation of 30% of switching costs to port investment is reasonable.

Finally, AT&T and MCI concur with the Commission that the selected cost model should calculate costs for the individual interoffice elements required for interoffice trunking, signaling, and local tandem services, and, as the Commission recognizes, only the Hatfield Model does so.

I. THE HATFIELD MODEL APPROPRIATELY CAPTURES THE DIFFERENT FORWARD-LOOKING COSTS OF HOST, STAND-ALONE, AND REMOTE SWITCHES.

In the Notice the Commission tentatively concluded that the chosen cost model "should include an algorithm that will place host switches in certain wire centers and remote switches in other wire centers." FNPRM ¶ 122. The Commission reached this conclusion based upon evidence that incumbent LECs are increasing their purchases of remote switches relative to their purchases of host switches, a practice the Commission correctly interprets as indicative of differences in the switching costs among host, stand-alone, and remote switches and the economies that may be obtainable by deploying an appropriate mix of switches. Id. ¶ 121. These three switch categories indisputably do exhibit different cost characteristics that may render one type more desirable in a specific wire center under particular circumstances. Hence, AT&T and MCI agree with the Commission that, to the extent reasonably practicable, the selected cost model should reflect the economies that are obtainable from use of an efficient mix of host, stand-alone, and remote switches -- and the Hatfield model advocated by AT&T and MCI appropriately does so.

In this regard, there are two possible approaches to modeling these switching cost characteristics. First, a cost model can, as the Hatfield Model does, rely on public data to construct a switching cost curve that reflects all available information about actual recent switch purchases, and hence the "market" view of the efficient forward-looking mix of different switch types. This market-based "averaging" approach is straightforward and verifiable, and, because it reflects market data and actual LEC purchasing practices without the biases that may infect "surveys" or more limited data sources, it is likely to produce a reasonably accurate estimate of actual forward-looking costs.

Second, a modeler could attempt, as the Notice suggests (FNPRM ¶ 122), to optimize dynamically the network switch configuration by calculating the most efficient switch for each wire center location given the type of switch at every other location. While such a dynamic approach might be ideal in theory, the enormous complexity of the simultaneous optimization calculations and the massive and elaborate data requirements would, in practice, render it both unworkable and unlikely to produce more accurate cost estimates.

As an initial matter, any such approach would require additional data regarding switch prices -- by manufacturer and switch type -- that simply is not available. Both requesting carriers and regulators, including the Commission, have long been frustrated by the unavailability of detailed data on switch prices even at the aggregate level, and by the unwillingness of incumbent LECs and switch manufacturers to provide such data in any usable or verifiable form.[7] In these circumstances, it is plainly unrealistic to assume the availability of the much more detailed cost information for every switch type that would be required to carry out a dynamic optimization process at the wire center level.

Further, even assuming its availability and accuracy, raw cost data could not simply be "entered" into an algorithm (again, assuming one could be written to account for all variables and

[7] See, e.g., Order, Federal-State Joint Board on Universal Service, CC Docket No. 96-45, DA 97-1433 (released July 9, 1997).

yield results in reasonable processing times, see, infra). Rather, assumptions (or additional calculations) would have to be made about the appropriate allocations of each host switch's processing time and equipment costs to the specific remote switches that are dependent on the host switch for particular functions. Again, because remotes only function with hosts from the same manufacturer, this would have to take place manufacturer-by-manufacturer, switch-type-by-switch-type.

Even if these imposing data hurdles could somehow be overcome, attempting to model the optimal, forward-looking mix of switch types would be extremely difficult, at best. The number and dependencies of the variables that would be required by the optimization algorithms is staggering. For example, a remote switch must be slaved to a host switch built by the same manufacturer. Hence, in order to determine the optimal switch type for a particular wire center, a dynamic algorithm must, at a minimum, account for the types of switches at other wire centers, the manufacturer, capacity, and capabilities of those switches, and the services the wire center being optimized must provide. The selection of a particular switch type for a wire center, however, impacts the optimal decision for every other wire center. In short, a dynamic algorithm must consider every factor that affects every wire center in order to allocate optimally a switch to a particular wire center. The simultaneous solution of the switch allocation algorithms for every wire center will be difficult, processor intensive, extremely sensitive to the underlying assumptions, and highly contentious. Even beyond these difficulties, the hypothetical algorithm would also need to decide whether or not to use a switch at a particular wire center at all. In many instances, a more efficient alternative would be simply to deploy Digital Loop Carrier

("DLC") equipment. This additional complexity would have a profound impact on the number of wire center equipment permutations.[8]

These difficulties cannot be overcome by looking to the embedded switch mix as a surrogate. Such an approach would plainly be inappropriate on a number of levels. Most fundamentally, relying on the embedded mix of switch types does not reflect the forward-looking optimal network configurations and therefore this approach would violate the core principle of the Commission's TELRIC methodology. For example, older remote switches have much smaller line capacities than newer ones and, therefore, a few years ago, ILECs would have installed more stand-alone switches. Today, remote switches have increased line capacity, and thus it would be more efficient to place a remote switch in some wire centers where the ILEC had previously located a stand-alone switch. For these and other reasons there is no reason to believe that the embedded network configuration reflects an efficient allocation of host, stand-alone, and remote switches from a forward-looking perspective. Indeed, the Commission in the Notice recognizes that the embedded switch mix does not comport with current purchasing practices. See FNPRM ¶ 121. There is certainly no reason to believe that substituting embedded mix assumptions for dynamic optimization -- which would not obviate the need to acquire currently unavailable data regarding switch prices -- would yield more accurate results than looking to LEC's current procurements of new switches for information about switch mix.

The Hatfield Model's reliance on a cost curve constructed using current ILEC purchasing characteristics avoids all the aforementioned difficulties. Specifically, the Hatfield Model reflects

[8] Simple combinatorial mathematics suggests that literally billions of configurations would need to be tested.

different switching cost characteristics by relying on figures from the NBI Report which estimated industry average switching prices paid per line per year.[9] Using this data, two switching cost curves were developed, one curve for large buyers like the RBOCs and GTE, and another for smaller ILECs to represent the rates ILECs currently pay for switches. These cost curves, then, capture today's shifted emphasis from standalone to host/remote switches, as well as many other strategic factors considered by ILECs in their network designs. By focusing on the full spectrum of current purchases rather than the historic configuration, this approach greatly increases the likelihood that the Hatfield Model will yield accurate estimates of forward-looking economic costs.

II. THE HATFIELD MODEL APPROPRIATELY ASSIGNS MULTIPLE SWITCHES TO A WIRE CENTER WHENEVER ONE OR MORE CONSERVATIVE CAPACITY CONSTRAINTS ARE EXCEEDED.

The Commission has correctly concluded that the selected cost model "should assign more than one switch to a wire center" in those instances where any of a switch's capacity constraints are exceeded. The Hatfield Model explicitly accounts for switch capacity constraints including the number of lines (80,000), traffic capacity (1,800,000 busy-hour hundred call seconds for the largest switch), and processing capacity (600,000 busy-hour call attempts for the largest switch) – all through user adjustable inputs. See Hatfield Model Description at 47. The Hatfield Model proponents included these switching capacity constraints because the market -- and therefore switch manufacturers and purchasers -- have identified them as important. If any of the "capacity

[9] Northern Business Information Study: U.S. Central Office Equipment Market -- 1995 Database, McGraw-Hill, New York, 1996 ("NBI Report"). The Hatfield Model also relies on the ARMIS 43-07 and responses to the 1994 USF Notice of Inquiry data request for public line and data on average lines per switch. See Hatfield Model Description at 48.

limit[s] [are] exceeded, the model will compute the investment required for additional switches." Id. To the extent necessary, AT&T and MCI will address the specific default input values in their input comments. However, it is plain that the default constraints are very conservative given the actual capacities of currently deployed switches. For example, Nortel[10] advertises a busy hour call attempt capacity of 1,400,000 and Lucent[11] has switches supporting over 100,000 lines.

III. THE HATFIELD MODEL APPROPRIATELY ADDRESSES THE "GROWTH LINE" ISSUE.

The Commission has postponed comment on specific switching input prices until October 17, 1997 (FNPRM ¶ 141) at which time AT&T and MCI will discuss the switch cost and other input and assumption values used by the Hatfield Model as well as the positions taken by other parties to this proceeding.[12] Accordingly, AT&T and MCI will limit their comments here to the issue of "whether or not [to] incorporate the cost of growth lines into [its] switching cost estimate" (FNPRM ¶ 132).

AT&T and MCI do not believe any adjustments to incorporate supposed cost differences between "new" and "growth" lines are appropriate. First, contrary to ILEC claims, there are no reliable, verifiable, publicly available data that establish a significant per-line cost difference -- even in nominal dollar terms -- between new switch purchases and later purchases of additional

[10] See Nortel's world-wide-web site at www.nortel.com.

[11] See Lucent's world-wide-web site at www.lucent.com.

[12] AT&T and MCI are currently evaluating the depreciation record-based data recently provided by the Commission and will comment on the appropriateness of relying on that data in this context when that evaluation is complete.

capacity for existing switches ("growth lines").[13] To the contrary, switch contract data reviewed by AT&T and MCI (which unfortunately remains proprietary) suggests that large ILEC switch contracts often reflect a single per-line price that encompasses both new and growth lines. And even where that is not so, it may simply reflect non-cost-based allocations by the parties to the contract, who, from a cost perspective, are concerned only with the total bottom-line purchase amount.[14]

But nominal dollar differences, even if they existed, would be irrelevant. Fundamental financial principles dictate that it would be patently inappropriate simply to lump together the nominal dollar costs of switches purchased today and switch capacity that might be purchased in the future. Put simply, even if an ILEC did agree to pay $100/line for growth lines in the same contract in which it paid $75 for new switch capacity, that ILEC's average cost/line in today's dollars (the time of modeling) could well remain $75 -- or even less -- given the time value of money and the fact that the "growth" lines are to be purchased, if at all, in the future. Indeed, if it were true that growth lines were significantly more expensive than new capacity, one might expect efficient ILECs to elect to pay prevailing prices for growth lines, rather than contracting in advance, given the long term downward trends in the prices of switch components (and the

[13] The "growth line" cost estimates provided by NBI, although clearly more reliable than the ILECs' unsubstantiated claims, are themselves problematic, because unlike the NBI estimates used in the Hatfield Model, the NBI "growth line" data are not sufficiently disaggregated to allow differentiation between large and small ILECs for comparison to corresponding "new" capacity costs.

[14] This is especially true given that ILECs may agree on growth line prices at the same time that they buy new switches. Thus the individual rate elements for growth lines in an aggregate contract can have no presumption of independent validity (but may instead reflect the ILEC's preferences for accounting or other purposes).

bargaining power the ILECs' continuing purchases give them with respect to switch manufacturers). The ILECs' claim that this does not happen is simply further evidence that there are no significant cost differences in real terms.

In any event, focusing on the "growth" costs of a single part of the network, while ignoring "growth" costs with respect to the remainder of the network would plainly be inappropriate. Even assuming that "growth" costs are higher in real dollar terms for switch capacity -- and there is no basis for any such assumption -- it is undeniable that precisely the opposite effect would be encountered with respect to "growth" costs for many other parts of the network (e.g., growth in loop plant is far cheaper than new on a unit basis). When coupled with the fact that the Hatfield Model makes very conservative capacity cost estimates that will tend to overstate switching costs, there is simply no justification for requiring upward "growth" line adjustments to cost estimates.

Finally, the Commission should not lose sight of the practical difficulties of obtaining reliable "growth" line cost data and appropriately accounting for the time value of money and real declines in switch capacity costs. In this regard, the "price" of various parties' proposals to scrap the Hatfield approach in favor of a hodgepodge of "surveys" and supposition on the grounds that the Hatfield Model curves do not perfectly account for all variables is the very reliability, verifiability and accuracy that the Commission, the states and industry participants have all recognized as critical.

IV. THE HATFIELD MODEL APPROPRIATELY INCLUDES A REASONABLE ALLOCATION OF PORT AND NON-PORT COSTS.

There can be little controversy over the Commission decision to divide switching costs between port and non-port costs. FNPRM ¶ 135. Precisely separating these costs presents significant difficulties, however, and any allocation necessarily will have some indeterminacy. Hence, it is critical that the Commission not adopt an allocation standard that exacerbates the problems with this separation process. In particular, consistent with the modeling principles discussed in the introductory statement, the selected mechanism should be manufacturer neutral. Failure to adhere to this maxim will render universal service subsidies sensitive to the particular mix of switching vendors. More importantly, under these circumstances vendor sensitivity of this type could be inconsistent with cost based pricing and therefore with forward-looking economic cost. The preferred approach in practice, then, is to allocate a reasonable portion of switching costs to the port. Currently, the Hatfield Model assigns 30% of total switch investment to the port, an allocation that has been supported by publicly available cost studies.[15]

The Commission has also decided that "all of the port cost and a percentage of the usage cost are costs of providing universal service." FNPRM ¶ 137. AT&T and MCI support this conclusion as well as the Commission's conclusion that local usage, as a percentage of other usage, should be allocated to universal service. Id. The Hatfield Model already employs exactly such an approach, separating switching costs associated with local traffic from other traffic on the basis of switching minutes, and then allocating the local traffic costs to universal service. Id. ¶ 134.

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[15] New York Study, Case 0657:94-C0095 & 91-C1174, Workpapers Part B at 93 (average 24% of line port); Massachusetts Study, 96-73/74: 96-75: 96-80/81: 96-83: 96-94 (filed Oct. 24, 1996) Workpaper Part B at 73 (average 43% of line port). The Commission has also sought comment "on whether alternative data sources are available for the purpose of estimating current cost...[and] how to obtain and use that information." FNPRM ¶ 136. The Hatfield Model currently relies on the best verifiable switching cost information as AT&T and MCI will demonstrate in their input comments to the Commission.

V. THE HATFIELD MODEL ACCURATELY DETERMINES THE COST OF THE SPECIFIC ELEMENTS NECESSARY TO PROVIDE INTEROFFICE TRUNKING, SIGNALING, AND LOCAL TANDEM SERVICES.

In its FNPRM, the Commission properly determined that the selected cost model should "calculate specific cost estimates for the interoffice elements" required to provide interoffice trunking, signaling, and local tandem services and that the Hatfield Model is the only model capable of producing "cost estimates at this level of specificity." FNPRM ¶ 141. Indeed, the Hatfield Model's flexibility and output specificity have allowed its proponents to demonstrate that the detailed modeling of these element costs is essential to an accurate assessment of universal service support because the cost of these elements varies significantly between densely and sparsely populated areas. In contrast, BCPM applies an overly simplistic multiplier to switching costs as a proxy for the cost of all of these services combined. Id. ¶ 140. In short, the Hatfield Model is the only reasonable choice with regard to interoffice investment cost estimation.

AT&T and MCI, of course, welcome suggestions on ways to improve the Hatfield Model's interoffice modeling. Contrary to ILEC statements, such refinements are quite likely to reduce, rather than inflate, overall cost estimates. For example, the Model assumes that interoffice traffic passes to other wire centers in proportion to their relative number of lines. In reality, more traffic is typically routed to closer wire centers, thereby reducing cost. The Hatfield Model also takes a conservative approach to the number of tandem switches and STPs.[16] For

[16] The Hatfield Model also uses the best verifiable input values for determining the costs of those elements used to provide interoffice trunking, signaling, and local tandem services. As requested by the Commission, these inputs will be discussed at length in AT&T and MCI's input comments. See FNPRM ¶ 141.

these and other reasons, the Hatfield Model's approach to the estimation of interoffice trunking, signaling, and local tandem costs is conservative.

CONCLUSION

For the foregoing reasons, the Commission should adopt the Hatfield Model approach to the switching issues raised in the Notice.

Respectfully submitted,

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August 8, 1997

CERTIFICATE OF SERVICE

I, Hagi Asfaw, do hereby certify that on this 8th day of August 1997, a copy of the foregoing "Comments of AT&T Corp. and MCI Telecommunications Corporation" was mailed by U. S. first class mail, postage prepaid, to the parties listed on the attached service list.

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